

Automated Pipe Production Methods Anticipated to Save \$7M on Several Ship Classes

Status: Pending Implementation

PROBLEM / OBJECTIVE

There are several thousand pipe welds on Navy ships, with each weld requiring a significant effort to produce. The Navy Metalworking Center (NMC) conducted a project to investigate and develop improved methods to reduce the cost of producing these welds. The project team developed portable mechanized tools and automation technologies to improve pipe fitting, welding, and installation on several naval platforms manufactured at Ingalls Shipbuilding (Ingalls), including the LHA(R), LPD, and DDG 51 classes, as well as the U.S. Coast Guard's National Security Cutter (NSC).

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

NMC worked with Ingalls personnel to identify, develop, and enhance several technologies and tools to support automation / mechanization of pipe production processes at Ingalls. Specifically, the three main technologies investigated were a) automated pipe welding with an orbital welding system, b) enhanced brazing techniques using a ring burner and a hook-style torch tip, and c) improved fitting and rounding of pipe ends leveraging an assortment of both commercial and prototype tools. Ingalls craftsmen tested and evaluated the technologies and tools throughout the project. The most effective methods were down-selected for time trials and subsequent implementation.

Implementation and Technology Transfer:

Several commercial and prototype fitting tools are being transitioned and pursued for implementation. NMC and Ingalls identified, developed, tested, and refined several unique pipe fitting and rounding tools. NMC also identified several potential commercialization partners and obtained budgetary pricing to support Ingalls' capital expenditure requests. Ingalls has implemented three pipe fitting and alignment tools (the custom splitting clamps, custom enhanced plug rounding tool, and the Intercon Enterprises pipe alignment clamp) and plans to purchase more of these tools for use throughout the shipyard on all platforms. Further development is required before the automated welding system and brazing technologies can be implemented. The initial implementation targets are the LHA(R) and DDG 117 hulls by the end of calendar year 2015, with full implementation expected prior to completion of LHA 7.

S2565 Pipe Production Automation Methods
Rev A (SEP15)



The automation/mechanization of pipe fabrication processes for shipboard applications will improve quality and reduce costs on multiple naval platforms.
Ingalls photo

Expected Benefits and Warfighter Impact:

Improved pipe production tools and technologies are expected to reduce the cost of manufacturing thin wall piping system components at Ingalls. Based on pilot studies performed, the total targeted five-year cost savings is approximately \$7M for the hulls constructed at Ingalls (LHA, DDG, LPD and NSC).

TIME LINE / MILESTONE

Start Date: November 2013
End Date: July 2015

FUNDING

Navy ManTech Investment: \$1.0M

PARTICIPANTS

PMS 377
NSWCCD
Ingalls
NMC
ONR Navy ManTech

This article was prepared by the Navy Metalworking Center, operated by Concurrent Technologies Corporation, under Contract N00014-10-D-0062 to the Office of Naval Research as part of the Navy ManTech Program. Approved for public release; distribution is unlimited.